ABSTRACT OF THE INVENTION

The present invention relates to a method and an apparatus for estimating discharge and charge power of battery applications, including battery packs used in Hybrid Electric Vehicles (HEV) and Electric Vehicles (EV). One charge/discharge power estimating method incorporates voltage, state-of-charge (SOC), power, and current design constraints and works for a user-specified prediction time horizon Δt. At least two cell models are used in calculating maximum charge/discharge power based on voltage limits. The first is a simple cell model that uses a Taylor-series expansion to linearize the equation involved. The second is a more complex and accurate model that models cell dynamics in discrete-time state-space form. The cell model can incorporate a inputs such as temperature, resistance, capacity, etc. One advantage of using model-based approach is that the same model may be used in both Kalman-filtering to produce the SOC and the estimation of maximum charge/discharge current based on voltage limits.